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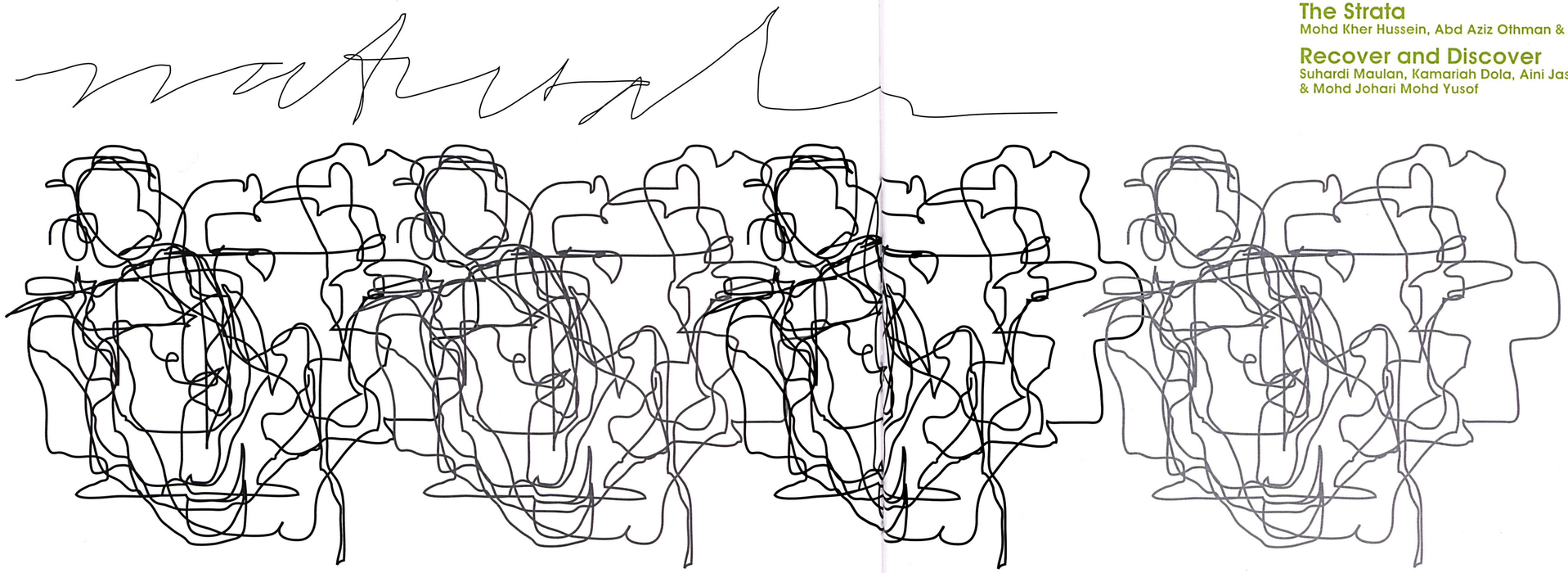

# Natural Landscape Resource : An Ecological Response

**Abd Aziz Othman & Nurhuzailin Hussain**

## Introduction

As one of the countries with the most biodiversity in the world, Malaysia is composed of a variety of forest ecosystem types which are related to one or more features of its location, notably soil quality, aspect and elevation. It can be seen originally as a continuous ecosystem which begins on the shores of the country —mudflat and mangrove forests—and expanding inland. The expansion goes through swamp and riverine forests, lowland dipterocarp forests, limestone forest and montane forests at the higher elevation. However, the unprecedented scale of changing landuse patterns over decades have transformed these ecosystems into a mosaic of habitats that include large and small fragments of primary forest as well as various degraded forests embedded in a matrix of developed area.

These fragmented forests have received great attention recently since there is an infinite and beautiful array of natural characters in the built environment which are specific to existing and timeless processes of life. Their importance has become apparent in landscape planning and design supported by the explosion of criticism against the amenity values of landscape resources, the environmental and ecosystem functions and habitat conservation. Hence, this chapter comes into being: to address a mean by which landscape resources can be exploited to establish a more efficient and healthy landscape for human habitation and for future sustainability. It presents landscape planning, design and analysis process, with simple method and ideas for describing landscapes and their functions.

## Natural Landscape Resource Planning and Design Process

The natural resource-based planning and design is a process that places the landscape's natural resource at the foreground. By identifying the resources at the beginning of the process, they will be used as the basis for sensitive site inventory and analysis. Since all natural resources are to be protected, in this case, they must be prioritized based on the site's values and context. All site's resources are assessed in a series of S.W.O.T. (strengths, weaknesses, opportunities and threats) analyse the common landscape analysis tool resulting in the planning and design rationalization or synthesis. An advanced landscape resources assessment such as GIS–based approach, Potential Site Analysis (PSA), can be used to obtain a quantitative result of the ecological assessment.

Based on the synthesis, the planning and design thought will be generated in order to solve the site issue. A conceptual idea and statement is produced prior to the planning and design by setting out the objectives and programmes as well as approaches focussed in the different parts of the site. The typical approaches needed for the landscape resources planning and design include the benefit sharing mechanism as well as some conservation and preservation measures for sustainable use and protection of natural landscapes. This provides a significant outline of the ecological planning and design strategy for a sensitive area.

Once the concept has been finalized, a master plan will be developed to realize the ideas. The master plan should be intended to protect and manage significant features, stands and sensitive landscapes and to achieve planning and design objectives set up for long term retention. The guidelines and detailing continue the ultimate process to direct development to areas most suited for them. The proposal expects to minimize impacts to prioritized natural resources through the location, design and engineering of new development.

## The Projects

Three significant ecosystems were selected for the exercise representing different ecological types of tropical forests. They are 1) the mangrove forest in Tanjung Agas, Negeri

Sembilan, 2) lowland dipterocarp forest in Bukit Mertajam, Penang and 3)limestone forest at Gunung Lang, Perak.

Beginning with the mangrove forest at Tanjung Agas, Negeri Sembilan, the site is one of the few remaining mangrove areas in the west coast of the peninsula. The forest is classified as managed mangrove forest, grows in tidal areas of the Linggi river mouth. The plant community is dominated by a common species of mangrove trees such as Rhizophora spp., Bruguiera spp. and Sonneratia spp. which can reach a height of 50 metres and only form a single stratum (layer) canopy. This forest features only a small number of plant species compared to the tropical rainforest that contains thousands of plant species. Although it lacks plant species diversity, the ecosystem provides a home for a great variety of other organisms and is an important natural resource for the coastal communities. As a biodiversity hub in the region, the design thus looks at the value of conservation and preservation approaches in protecting the site's natural character. 'Osmotic Greenization' is a metaphor of the estuary ecosystem where the organisms have a great symbiotic interaction in creating an ideal ecosystem.

The next ecosystem type is the lowland dipterocarp forest in Bukit Mertajam, known as Bukit Mertajam Recreational Forest. The site is strategically located in the middle of the town, surrounded by residential, commercial and industrial areas. It comprises 340 hectares of low land and hilly terrain up to 457 metres above sea level, being a green landmark in the region. It is classified as a managed lowland dipterocarp forest consisting of various species of dipterocarps such as Shorea curtisii (Meranti Seraya) and Shorea acuminate (Meranti Rambai Daun) and non dipterocarps. Gazetted as a protected reserved forest, the site acts as a prominent green lung for the region as well as being an important source of recreation for the local communities. The design's idea, 'Recover and Discover' thus focuses on the balance between need of the forest conservation in enhancing the character of lowland dipterocarp forest and the community demand of recreation and education.

The limestone forest at Gunung Lang is another prominent ecosystem of the tropic occurs in the Kinta Valley, Ipoh Perak. The site comprises of unexplored limestone hills range, caves and lake. They form part of the natural landscape that are essential to the region's ecological system. For example, caves within the hills support bat populations vital for pollination and pest control. The underground river systems help and regulate the flow of water into the main rivers. The forest is also home to many rare species especially wild orchid which ideally adapted to the harsh environment of limestone hills. Hence, the Gunung Lang's limestone forest is classified as a forest of special habitat due to its unique and sensitive geological structure. Based on these features, the site is assessed and designed for its biodiversity, educational and recreational values as well as to be a natural landmark and vital green space for the Ipoh's landscape. 'The Strata' is a concept that reflects the layers of sedimentary rock in forming the magnificent character of the limestone hill.

## Conclusion

The planning and design process discussed is probably generic enough to be extrapolated to most natural landscapes. The information is qualitative in nature and highlights basic concepts of resource planning which shown by the following examples, but does not address the design approach and strategy in great depth. The hope is to encourage a more enlightened and purposeful planning and design concept of forest landscapes. Understanding the resources is thus important in giving a design solution a greater level of efficient and effective sustainable outcome.

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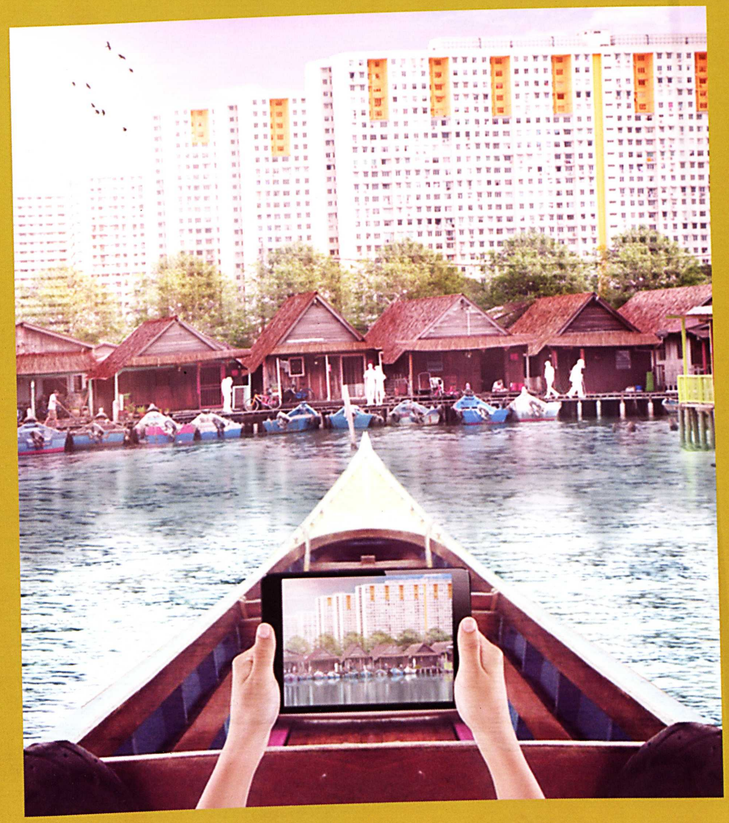
# Jury Review

Khalilah Zakariya

In this project, the student examined the site of study using an overlay technique. While this techique is useful to work with large-scale sites, however, there is still a need to understand the characteristics of the site at the eye-level. This may include the existing characteristics of the buildings, landscape, physiographic characters of the land and activities that locals do. Due to the lack of explanation on existing conditions and photos from the site, it is difficult for audience to understand the suitability of the proposed design ideas.

Devendiran S.T. Mani

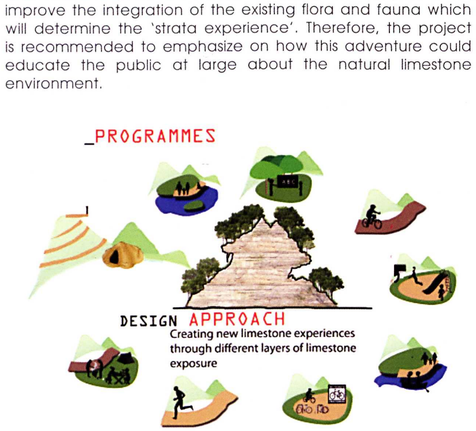
The titles of the projects give us a sense discovery to be explored and the students have indicated quite briefly on the background of the site. The site analysis is also well addressed. The designer's intention was clearly stated with existing photos and written statement. The student has missed out the existing flora and fauna which are the most important elements for the design criteria. They could help determine the 'strata experience' and provide the platform for the concept. However, the design strategies are described briefly through diagrams and sections which indicate different levels of activities for the public. The design concept and ideas are good and are well documented. It is a good Master plan with information and with perspective while the graphics are vibrant and lively. Overall, it display an attractive presentation with good graphics and ideas are quite unique which the students have bravely approached to table the design criteria to preserve the fragile ecosystem.



# The Strata

**Mohd Kher Hussein, Abd Aziz Othman & Murad Abdul Ghani**

Limestone hills in Malaysia are being threatened from quarrying and clearing activities and receive little protection and conservation from relevant parties such as Municipal Councils. Therefore, an effort towards conservation and preservation for this area is vital. This project applied a concept of "strata" for conserving the Gunung Lang limestone hills in Ipoh, Perak. Three elements were stressed: education, recreation and nature. The goal is to promote the unique geological structure of limestone hill to the public which will increase the community's awareness towards limestone hills' roles and functions. This project is similar with the project Timeline at Bukit Larut, Taiping, Perak done by Tan Jiun Shyan (Emran, et. al. 2012) to rejuvenate the area by translating the chronology of the environmental-architectural and relationship of the areas. However, the project could improve the integration of the existing flora and fauna which will determine the 'strata experience'. Therefore, the project is recommended to emphasize on how this adventure could educate the public at large about the natural limestone environment.





Nur Amira Bt Noor Kamal

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# Recover and Discover

**Suhardi Maulan, Kamariah Dola, Aini Jasmin Ghazali & Mohd Johari Mohd Yusof**

Rehabilitation and conservation of Bukit Mertajam Forest Reserved is the main objective of the project but Liew Tsin Chai wanted to give new meaning to the forest by rejuvenating it with new activities to support ecotourism. The concept used to explore the design is "The Intersection – Journey to Recover and Discover", in which the designer envisioned the visitors would be at awed with the charm of the forest while discovering new things about the forest ecosystem, recreational activities and services provided. The strength about the project is its formulation of Land Conservation Strategy. It is based on Recreational Opportunity Spectrum (ROS) developed by the United States Forest Services (USFS) to managed possible conflicts between fragile forest ecosystem and human recreational activities (www.rco.wa.gov/documents/rec_trends/Wa_Trails_Plan-1991.pdf). Each management classification has taken into account consideration of visitors, settings, activities, impacts and management strategy. Nevertheless, the design can be further improved if Tsin Chai carefully looked at the relationship between the forest and immediate local context. Strong relationship and integration of Bukit Mertajam city with Bukit Mertajam Forest Reserved would make the design more cohesive and the ecosystem of the city would be further improved and enhanced.


Liew Tsui Chai

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